

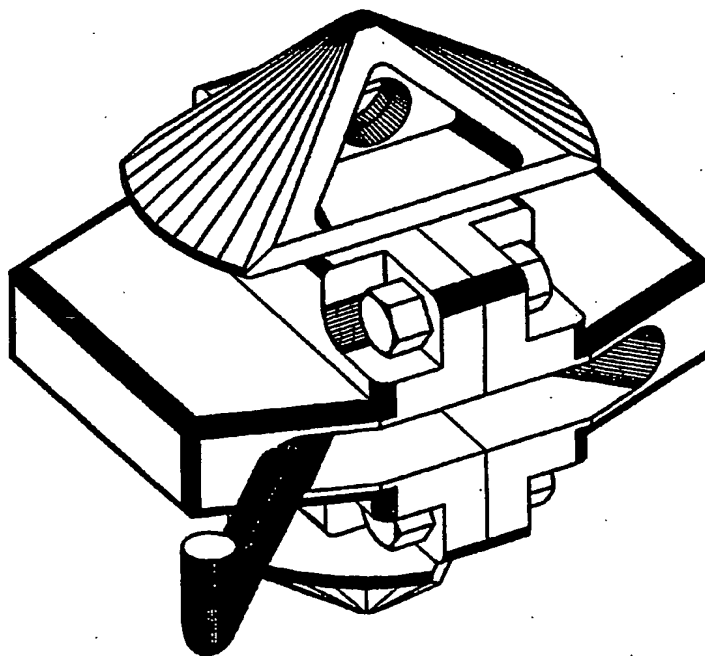
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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<b>(21) International Application Number:</b> PCT/EP95/02521 <b>(22) International Filing Date:</b> 29 June 1995 (29.06.95) <b>(30) Priority Data:</b> 9401125 6 July 1994 (06.07.94) NL <b>(71)(72) Applicants and Inventors:</b> HEUSER-DE WIJS, Beatrix, Gerda [NL/NL]; Hazersweg 28, NL-3253 XG Ouddorp (NL). HEUSER, Jan [NL/NL]; Hazersweg 28, NL-3253 XG Ouddorp (NL).		<b>(81) Designated States:</b> JP, KR, US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>With international search report.</i>

**(54) Title:** DUAL-FUNCTION COUPLING DEVICE FOR INTERLOCKING CONTAINERS PLACED ON TOP OF ONE ANOTHER**(57) Abstract**

A semi-automatic dual-function coupling device, also applicable as a conventional dual-function coupling device, for interlocking of containers placed on top of one another and are provided near the corners of their top and bottom face with corner fittings with a passage slit and a twist-lock pocket, comprises a housing (1), a rotary shaft (2) extending through the housing, twist-lock cones (3, 4) which are fixed at both ends of said shaft and of which the longitudinal directions form an angle with each other, the lower cone (4) is chamfered in such a way that semi-automatic locking is possible, a control rod (6) for rotating said shaft (2), projecting laterally from the housing, and connecting or to be connected to said shaft (2), an inside spring (7) to enable the semi-automatic locking, and arresting devices (11, 12, 13) for arresting said shaft (2) in the three possible positions, the two twist-lock cones (3, 4) in the form of a twisting cone with a number of side faces (5a, 5b) tapering to a tip (5c), the angle between the longitudinal directions of the twist-lock cones (3, 4) is 45°. To design and produce the locking device at low costs and nevertheless suitable for universal use, both parts of the housing are identical.



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Description

Title: Dual-function coupling device for interlocking containers placed on top of one another.

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The invention relates to a coupling device for interlocking containers which are placed on top of one another and are provided in top and bottom face at their corners with corner fittings with a passage slit and a twist lock pocket, comprising:

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- a housing,
- a rotary shaft extending through the housing,
- twist-locks which are fixed at both ends of the shaft so that they form an angle with each other, each twistlock having a number of side faces tapering to a tip,
- an actuating handle for rotating said shaft, said handle projecting laterally from the housing and connected to said shaft,
- and arresting devices for arresting the shaft in two end positions as well as an intermediate position.

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Such an coupling device is disclosed in DE-A-3642399.

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Coupling devices for interlocking containers are either used in the so-called European method, in which the handling takes place aboard the ship and coupling devices are inserted into corner fittings on the top surface of an already loaded container, or in the so-called American method, in which the handling takes place ashore and the coupling devices are inserted into corner fittings on the bottom surface of a container to be loaded.

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5 The coupling device disclosed in DE-A-3642399 is  
able to bring the twist locks automatically into  
the locking position. It comprises two pressure  
10 springs mounted between a vertically movable  
switch piece and a switch slide. As a matter of  
fact it can be used in the European way ( placing  
the twistlocks on top of already loaded containers  
aboard the ship ) and in the American way ( at the  
15 quayside connecting of the twistlocks to the lower  
end of a container prior to the loading ),

however if the European method is chosen during  
the loading procedure of the containers, the  
unloading has to be carried out in the European  
way as well, and on the other hand, if the  
20 American method is chosen during the loading-  
procedure of the containers, the unloading has to  
be carried out in the American way as well.

In fact starting from the American way of use, the  
coupling device has to be turned upside down to  
25 make it possible to use it in the European way ( vide DE-A-3642399, column 2, lines 61-68). It is  
impossible to load the containers by using the  
European method and to unload these containers by  
carrying out the American method and vice versa.

30 The object of the invention is to avoid these  
disadvantages and to produce a coupling device of  
the type mentioned in the preamble, in which the  
European method can be used in loading the  
35 containers and the American method can be used in  
unloading these same containers and vice versa,  
including a semi-automatic locking of the coupling  
device during the American loading method.

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According to the invention, the coupling device mentioned in the preamble is to this end characterized in that the angle between the twist-lock cones is essentially  $45^\circ$ , that the rotary movement of said shaft during the unloading of the containers is only accomplished by hand and that the rotary movement of said shaft during loading the containers in the American way is accomplished by placing the containers on top of each other (semi-automatic locking) and the rotary movement of said shaft during the European loading method is only accomplished by hand and that the actuating handle has an indicator to indicate which of the two twist locks has to be positioned upwards and to avoid confusion about the locking positions.

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It is of essential importance that the actuating handle has an indicator to show which of the twist locks has to be positioned upwards. If such an indicator is missing and the handle is turned to the left it cannot be established whether the containers are locked to each other or not.

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( Note: Normal position: lefthand total locking; if the twist lock is placed upside down, the locking position is right handed ).

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If such an indicator is present and the handle is turned to the left, one can be sure that the containers are locked to each other when the indicator shows the proper upward position.

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In case of an upside twist-lock without an indicator, there is a considerable risk of accidents and damages, because no one can perceive, whether the twist lock is locked or unlocked.

5 The object of the invention is to avoid these situations and to make clear in every moment of the operation, whether the coupling device is locked or unlocked.

10 In this respect it is important to realize that on board of a container vessel a uniform method has to be used for positioning the coupling devices.

15 It is unthinkable that in one part of the ship the coupling devices have a certain position ( e.g. as following from the European way of fixing ) and in another part of the same ship the coupling devices are positioned upside down ( e.g. as following from the American way of fixing ).

20 According to the invention, the coupling device is always in the same vertical position between the two piled up containers and it can be connected in this position, either first to the upper corner fitting of a lower container and then to the lower corner fitting of the upper container ( locked by hand after lowering the upper container ), or first to the lower corner fitting of an upper container and then to the upper corner fitting of a lower container ( locked semi-automatically during loading ).

35 USA-3820474 and DE-OS-2204915 discloses a non-automatic coupling device for interlocking containers which are placed on top of another, said coupling device comprises a housing, a rotary shaft extending through the housing, a twist lock and a number of side faces tapering to a tip and fixed at one end of said shaft and a twist lock fixed at the other end of said shaft and having the shape of a bun with vertical side walls.

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The angle between the twist locks is 30° rather than 45° and the coupling device has only two arresting positions for arresting the shaft into end positions.

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There is no third arresting position for arresting the shaft in a position halfway between the end positions. Therefore the multi-functional use of this prior construction is not possible. Finally the actuating handle has no indicator to indicate which of the two twist locks has to be positioned upwards.

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In case of normal use of this known coupling device the bun-shaped twist lock is inserted in each of the four corner fittings on the underside of a container and by turning the actuating handle through a certain angle to the one locked end position, the locking occurs. The downward projecting twist lock cone, having side faces tapering to a tip, is then in the correct position for inserting into a corner fitting on the top face of a container. Locking between two containers, stacked one on top of the other, can be achieved by turning the four twisting cones, thus inserted into corner fittings on the top face of a container, to the other locked end position.

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When the consignment has reached its destination, the twisting cones are taken into a position in which the coupling device is no longer locked relative to the lower container and transferred hanging from the bottom face of the container to the quay or, if a container with a second travelling crab is used, to a buffer platform of said crane.

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These coupling devices will have to be removed there before the container can be placed on a

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chassis loader or on the buffer platform.  
This constitutes a practical disadvantage.  
Furthermore these coupling devices has no  
opportunity for semi-automatic locking.

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The object of the invention is to avoid these  
disadvantages.

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The invention will now be explained in greater  
detail with reference to the figures.

Figure 1 shows the design of the housing, of which  
the two parts are identical.

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Figure 2 shows the specific parts of the coupling  
device.

Figure 3 shows the design of the axis and the  
cones.

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Figure 4 shows a cross-section through the  
housing, to illustrate the locking mechanism.

Figure 5 shows the arresting devices.

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Figure 6 shows a perspective view of the coupling  
device according to the invention.

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The three-position semi-automatic twistlock shown,  
comprises a cast-iron housing (1), a rotary shaft  
(2), extending through the housing and so-called  
locating twisting cones (3) and (4), provided on  
each of the ends of the rotary shaft,

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having two opposite-lying slanting faces (5a)  
which, together with the two other narrow side

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faces (5b), taper to a common tip (5c).

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The twisting cone (4) is shaped in such a way, that if the coupling device is fitted in the lower corner fitting of an upper container, said coupling device being in a locked position during loading, while lowering the upper container on the lower container, the twisting cones and the shaft are rotated and the coupling device connects the two vertical containers automatically by re-rotating the shaft and the twisting cones by means of a built-in spring mechanism (7).

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Fitted on the rotary shaft is a control rod (6), which projects laterally through a slit-shaped hole (8) into the housing (1), and by means of which the shaft with the twisting cones can be rotated through a limited angle. The rod (6) is bent 90° upwards on the end (9).

25

As can be seen from the figures, the longitudinal directions of the two twisting cones form an angle of 45° with each other.

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The top cone (3) has a hole (10), which makes it possible to lift the coupling device, using a rod or piece of reinforcing steel, and which is also an identifying mark for the top side of the coupling device.

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In the European method for interlocking of containers to be stacked one on top of the other, the four twist locks are fitted in the four corner fittings in the top face of a container placed on board of the ship.

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5 When the American method is used, on the quayside four coupling devices are connected to the underside of a container, prior to lifting the container aboard the ship.

10 Both the angle at the end of control rod (6) and the hole (10) in the top cone give an indication, that the coupling device is not being used in the inverted position.

15 In European harbours the coupling devices are unlocked by moving the control rod to the right horizontal position, before discharging the upper container and the coupling devices are left behind on the top side of the container below for subsequent removal and collection.

20 In American harbours the coupling devices are unlocked by moving the control rod to the mid-horizontal position, before unloading the upper container and will be taken along with the container to the quayside, where they will be removed from the lower corner castings of that container.

30 Figure 5 shows the device, with which the shaft can be locked in two end positions and a centre position. This mechanism comprises two springs (11) together with 2 pins (12), placed opposite to each other, each pin corresponding with a hole (13) in the axis(2).

35 Because of the three different twisting positions of the axis (2), there are six holes (13) in the axis.

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It will be clear that in the two end positions and the centre position the twisting cones assume a stable arrested position, because the two pins have fallen in two of the six holes in the axis.

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The coupling device shown is universally usable, as it can be used as a semi-automatic cone and also used as a normal mechanical hand-operated twist lock cone, furthermore it is of the so-called "dual-function-type", which means that the device can be used either connected to the lower part of a container at the quaside prior to loading ( and disconnected at the quaside after discharging ), or be placed on top of a already loaded container aboard the ship before loading a container ( and disconnected aboard the ship from top of a lower container after discharging the container ).

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The main advantages of the invention are:

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that where the American loading method has been used, the European method can be used for the unloading procedure, and vice versa, without inverting the twistlock cone.

that it is relatively cheap;

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that it is not easily damaged;

that no delays occur during loading and unloading;

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that container cranes with a buffer platform and a second crab can be used without any problem;

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that no additional personel is needed on the quay  
or on platforms of container cranes to remove or  
fit coupling devices ( optional )

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that no provisions are needed to distribute the  
coupling devices on the quay ( optional )

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that production ( handling of containers per hour )  
can be considerably increased compared with the  
use of other designs of semi-automatic coupling  
devices;

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no technical disturbances as a result of a simple  
technical design

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as a result of the angle at the end of the control  
rod, it is always in view in which vertical  
position the twistlock cone has been placed, and  
there is always in view wether the coupling device  
is locked or unlocked;

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because of the fact that the control rod indicates  
the mode of the twistlock cone, misunderstandings  
about being locked or unlocked of the device  
cannot take place and therefore damage and or  
accidents can be avoided;

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the semi-automatic twistlock-cone is of the so-  
called "Dual fuction type", which means that ports  
with different procedures for loading/unloading  
can use this coupling device in their own way,  
without determining the loading/unloading  
procedure of the next port.

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This includes that the coupling device will be placed always in the same vertical position, no matter the device is either connected ashore to the container prior to the loading of that container, or the device is connected aboard the ship on top of a already loaded container, before loading the next container on top.

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Misunderstandings about being locked or unlocked can be avoided, as well as damages and accidents.

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the locking device, described in the preamble, used in combination with lashing bars, means a contribution to the safety of sea-going ships, because the lashing bars prevent the unlocking of the coupling device, by blocking the movement of the actuating handle (6).

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REFERENCE NUMERALS.

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1. Housing
2. Shaft
3. Upper cone
4. Lower cone
- 5a. Slanting faces
- 5b. Side faces
- 5c. Common tip
6. Actuating handle
7. Spring around the axis
8. Saving in the housing
9. 90° Angle of the actuating handle
10. Hole in the upper cone
11. Inside spring
12. Pin
13. Hole in the axis

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CLAIMS

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1. Dual-function semi-automatic coupling device for interlocking containers which are placed on top of one another and are provided in top and bottom face at their corners with corner fittings with a passage slit and a twist lock pocket, comprising:

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- a housing (1)

- a rotary shaft (2), extending through the housing

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- twist locks (3,4), which are fixed at both ends of said shaft, so that they form an angle of 45° with each other, the upper twist lock having a number of side faces (5b), and a number of slanting faces (5a), tapering to a tip (5c),

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-the lower twistlock (4) shaped in such a way, that using the coupling device in the American way, the rotary movement of that lower twist lock (4), to prevent locking the coupling device in the intermediate position during lowering the upper container, will be no more than 35°

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-the upper twistlock cone has a hole (10) to indicate the vertical position of the coupling device;

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- an actuating handle (6) for rotating said shaft (2) , said handle projecting laterally from the housing (1) and connected to said shaft (2),

- arresting devices (11,12) for arresting the shaft in two end positions as well as the intermediate position;

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-characterized in that the angle between the twist locks (3,4) is essentially 45°, that the rotary movement of said shaft (2) is accomplished, either

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by moving the actuating handle (6) by hand, or automatically during the loading procedure, lowering the upper container, using the coupling device in the American way, the interlocking of the two containers on top of each other will be accomplished by a spring (7) around the shaft, that the actuating handle has an indicator (9), to indicate which of the two twist locks has to be positioned upwards;

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FIGURE 1

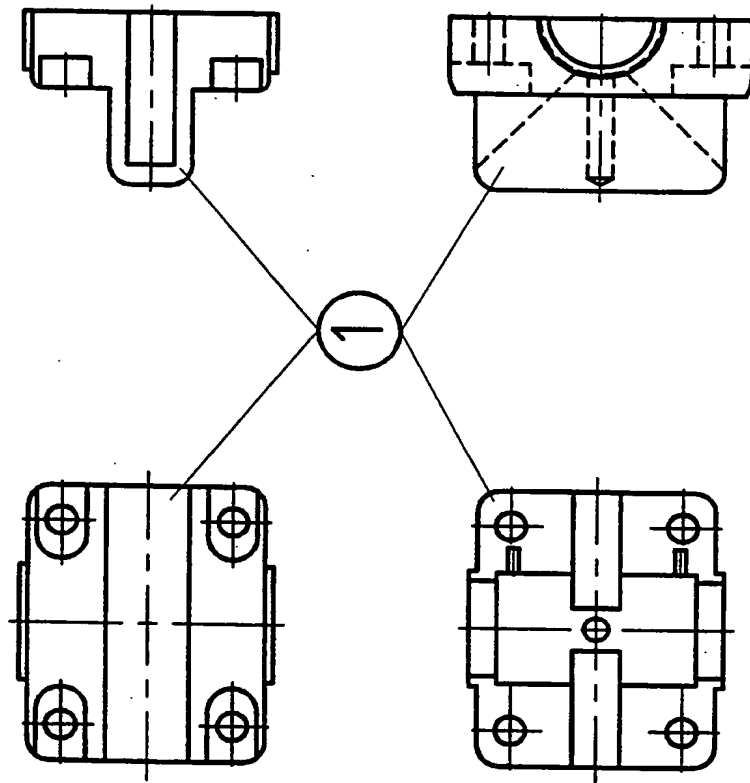


FIGURE 2

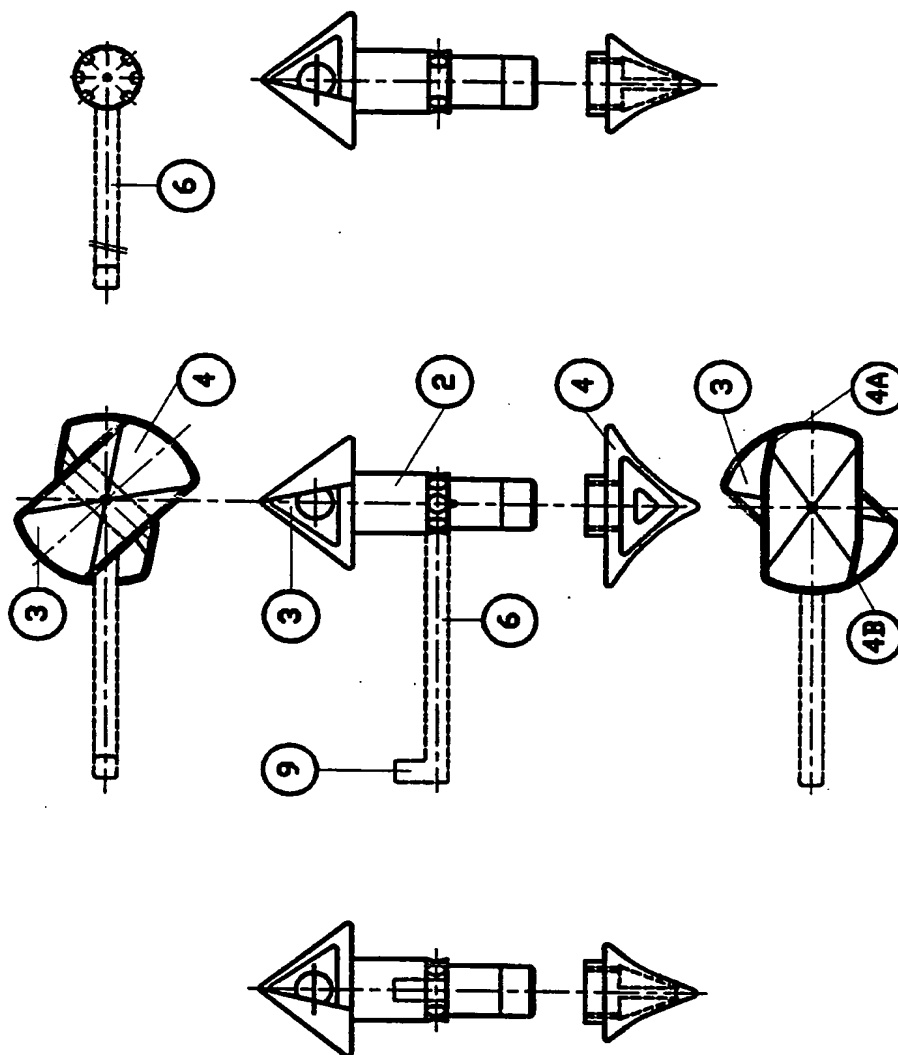


FIGURE 3

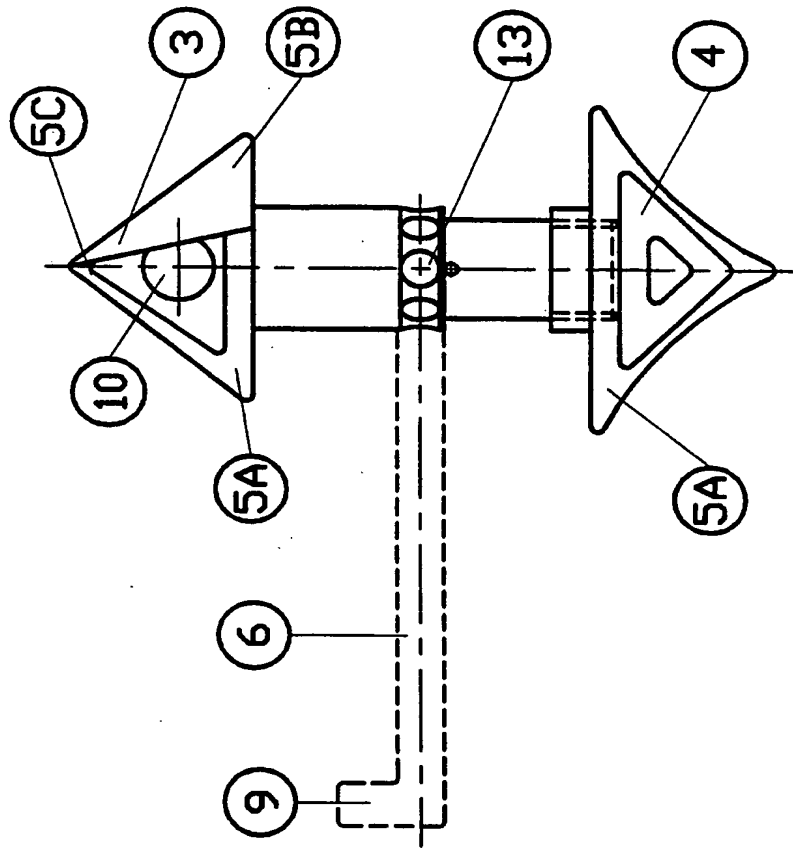


FIGURE 4

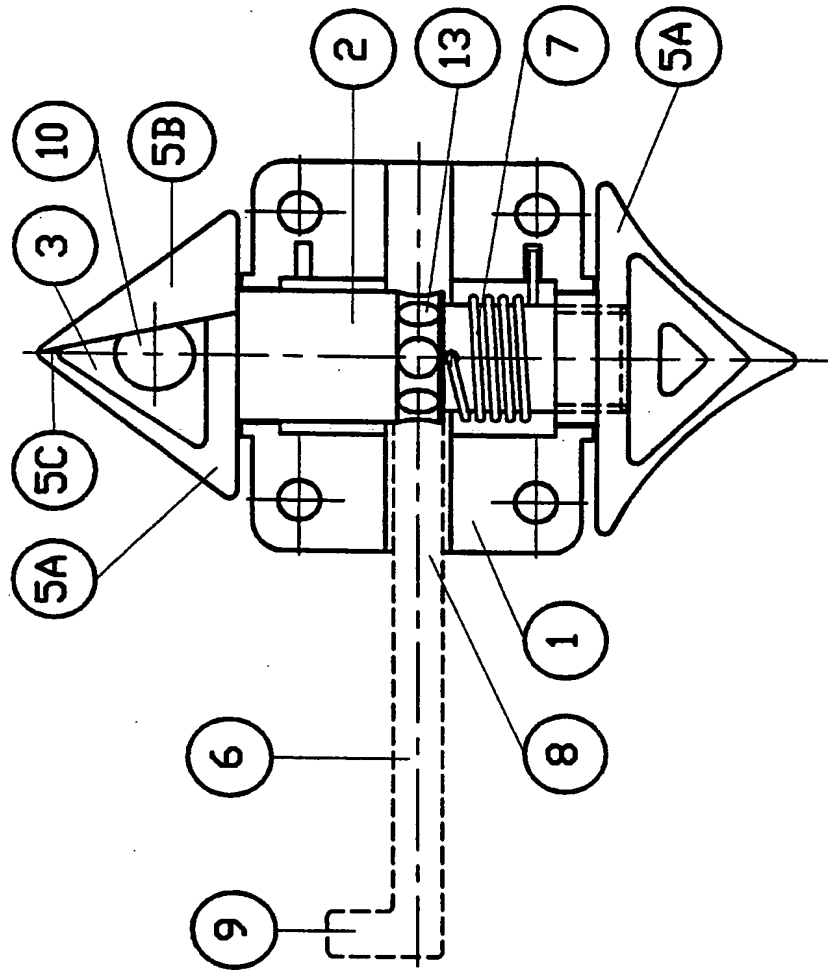


FIGURE 5

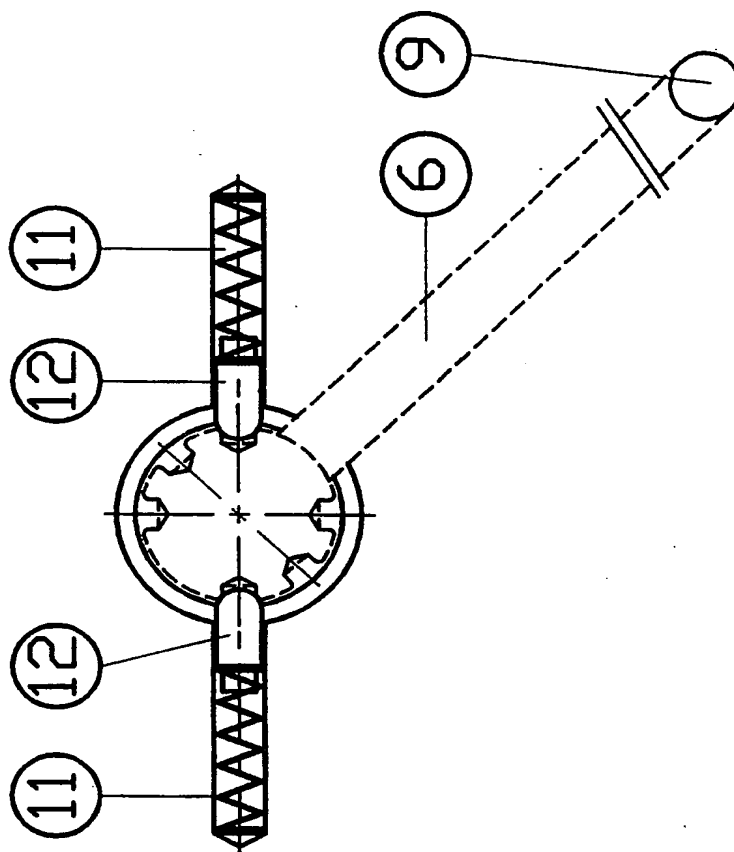
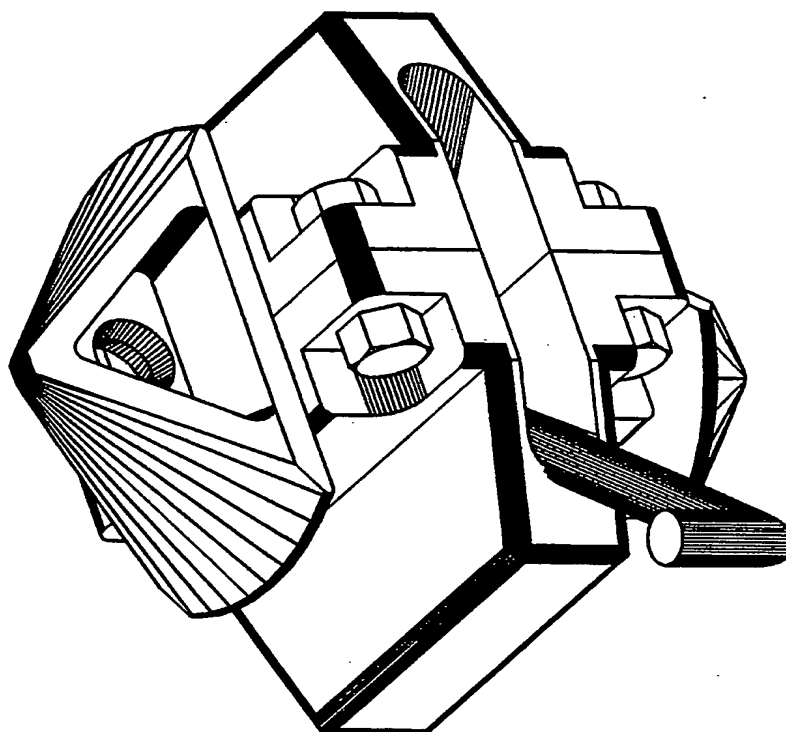


FIGURE 6



# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP 95/02521

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 B65D90/00 F16B1/00 F16B2/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B65D B60P B63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO,A,92 13783 (HEUSER JAN) 20 August 1992 see abstract; claims; figures ---	1
Y	EP,A,0 284 788 (CONVER-OSR OZEAN-SEVICE-REPARATUR-INGENIEURTECHNIK GMBH) 5 October 1988 see claim 12; figures ---	1
A	FORDERN UND HEBEN, vol. 38, no. 1, January 1988 MAINZ DE, pages 9-10, DR F. MECHTOLD 'ALLES ÜBER SPREADER-TEIL 2' see page 10; figure 13 ---	1
A	GB,A,2 004 941 (AB BACKTEMANS PATENTER) 11 April 1979 see page 2, line 42 - line 91; figures -----	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

23 October 1995

Date of mailing of the international search report

25.10.95

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**INTERNATIONAL SEARCH REPORT**

information on patent family members

International Application No

PCT/EP 95/02521

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO-A-9213783	20-08-92	NL-A- 9100232	01-09-92
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		SE-A- 7710804	28-03-79
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